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Seroprevalence of Babesia ovis in small ruminants in Siwa Oasis, Egypt

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Seroprevalence of *Babesia ovis* in sheep and goats was studied in Siwa Oasis between January 2002 and January 2003. A total of 240 blood samples were collected from 108 sheep and 132 goats for preparation of blood smears and for separation of serum samples and tested against *B. ovis* by using IFAT. *B. ovis* was detected in 55 (50.92%) and 59 (44.69%) blood smears examined in sheep and goats, respectively. The overall prevalence of *B. ovis* infection was 71.3% in sheep and 68.2% in goat using IFAT. The seasonal prevalence of *B.ovis* peaked in both spring and summer as revealed by blood smear examination and IFAT. A total of 143 ticks were collected from 62 sheep and 81 goats during the study. The ticks examined were *Rhipicephalus turanicus* (75.52%) and *Hyalomma anatolicum* (24.48%).

Babesia ovis is an intraerythrocytic protozoan parasite that causes babesiosis in sheep and goats. The disease has economic importance in subtropical and tropical regions of the world, Ristic, (1981) and Levine, (1985). It leads to significant losses among small ruminants due to its drastic effect on hemobiotic system, Radostits *et al*. (2000). Since the indirect immunofluorescence antibody technique (IFAT) has become available for a serological diagnosis and survey of babesiosis, it is possible to test serum samples for babesiosis with high sensitivity.

A number of epidemiological surveys on ovine babesiosis have been reported using IFAT technique in Egypt, (Mahmoud, 1992; Abou-Elnaga, 2000,2002) however there no literature on ovine babesiosis in Siwa Oasis.

The purpose of this study is to document the presence of *B. ovis* in Siwa Oasis in order to provide information on the prevalence and intensity of infection in sheep and goats.

Materials and Methods

Sampling. Blood samples were collected from 108 sheep and 132 goat (aged from three months and up to three years) in Siwa Oasis for a period of one year from January 2002 to January 2003. The animals sampled from each flock were selected randomly. Sera were separated by centrifugation and stored at -20ºC.

Blood smears. Thin blood smears were prepared from the blood of 108 sheep and 132 goats and examined according to (Kruse and Prichard, 1982).

IFAT. 240 serum samples (108 from sheep and 132 from goats) were tested for antibodies against *B. ovis* antigen. The antigen was prepared according to (Leeflang and Perie, 1972). Whole blood (6% parasitaemia) was drown into phosphate buffer saline (PBS pH 7.4) in such a proportion that coagulation was prevented (8ml blood/100 ml PBS). The mixture was centrifuged and the sediment was washed three times in PBS to free the antigen, the final sediment was restored to the initial blood volume, adjusted by PBS containing 1% bovine serum albumen to aid in adherence of cells to the microscopic slides. Uniform thin smears, covering the entire surface of a clean microscopic slide, were made and air dried. Masking tap was applied to the dried cell surface, wrapped in groups of five sides in aluminum foil and stored at -70 ºC until used by

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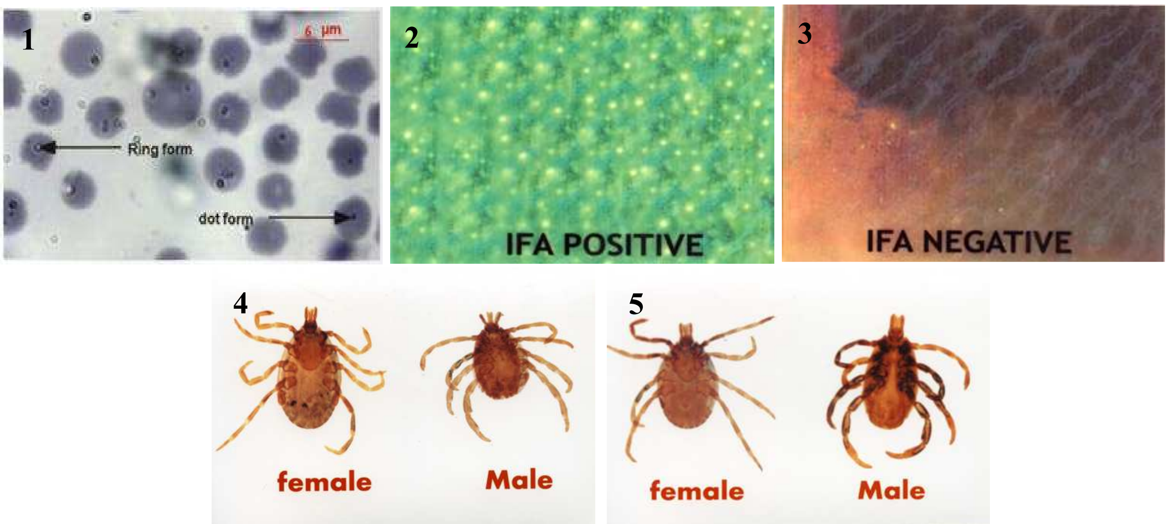


Photo (1): Ring form and dot form of *B.ovis* in blood film. Photo (2): Negative IFA for *B.ovis* Photo (3): Positive IFA for *B.ovis*. Photo (4): *Rhipicephalus turanicus* female and male ticks collected from sheep and goats. Photo (5): *Hyalomma anatolicum* female and male ticks collected from sheep and goats.

Table (1): Prevalence of *B.ovi*s infection among sheep using blood film examination.

Season	No. of Examined sheep	Blood film examination	
		Positive cases	
		No.	%
Summer	41	21	(51.21%)
Autumn	11	5	(45.45%)
Winter	31	15	(48.38%)
Spring	25	14	(56.00%)
Total	108	55	(50.92%)

Table (2): Prevalence of *B.ovis* infection among goats using blood film examination

Season	No. of Examined Goats	Blood film examination	
		Positive cases	
		No.	%
Summer	19	10	(52.63%)
Autumn	49	17	(34.69%)
Winter	29	13	(44.82%)
Spring	35	19	(54.28%) *
Total	132	59	(44.69%)

* Significant $p \leq 0.05$

Table (3): Prevalence of *Babesia ovis* infection among sheep using indirect fluorescent antibody test (IFA) in Siwa Oasis.

Season	No. of Examined sheep *No.*	No. of positive cases	
		No.	%
Summer	41	31	(75.6%)
Autumn	11	7	(63.6%)
Winter	31	20	(64.5%)
Spring	25	19	(76%)
Total	108	77	(71.3%)

Table (4): Prevalence of *Babesia ovis* infection among goats using indirect fluorescent antibody test (IFA) in Siwa Oasis.

Season	No. of Examined Goats	No. of positive cases	
		No.	%
Summer	19	14	(73.7%)
Autumn	49	32	(65.3%)
Winter	29	18	(62.1%)
Spring	35	26	(74.3%)
Total	132	90	(68.2%)

Table (5): Identification of tick species collected from sheep and goats in Siwa Oasis

Total Number of collected tick samples	Sheep				Goats			
	Rhipicephalus turanicus		*Hyalomma anatolicum*		*Rhipicephalus turanicus*		*Hyalomma anatolicum*	
143	Male	Female	Male	Female	Male	Female	Male	Female
	16	26	7	13	21	45	4	11
	11.18%	18.18%	4.89%	9. 09%	14.68%	31.46	2.79%	7. 69%

IFAT using methods previously described by (Goff *et al*., 1982; Tender and Friedhoff, 1988).

Ticks. One hundred and forty three ticks (62 from sheep and 81 from goats) were collected from sheep and goats. Ticks were identified in Prarsitology Department, Faculty of Veterinary Medicine, Cairo University using stereozoom microscope (Olympus) and Hoogstraal keys according to (Hoogstraal, 1956).

Results

The examination of Giemsa stained blood smears revealed the presence of *B. ovis* piroplasms in 55 sheep (50.92%) and 59 goats (44.69%). (Table 1, 2, Photo 1). The seasonal distribution of *B. ovis* infection peaked in spring (56%) and (54.28%) in sheep and goats respectively followed by summer (51.21%) and (52.63%) in sheep and goats respectively. The prevalence of infection between seasons was found to be statistically significant ($p<0.05$) according to (Snedecor and Cochram, 1980).

A total of 240 ovine serum samples (108 from sheep and 132 from goats) collected from Siwa Oasis were tested for the presence of antibodies

against *B. ovis*; 167 samples (77 from sheep and 90 from goats) were found to be positive and the overall prevalence was estimated to be 69.58% (71.3% in sheep and 68.2% in goats). Photo (2) shows negative IFA to *B.ovis*. Photo (3) shows positive IFAT to *B.ovis* (Table 3) shows the number of sheep tested and the proportions reacting positively to the IFAT of *B. ovis* antibody in different seasons. Table 4 shows the number of goats tested and the proportions reacting positively to the IFAT of *B.ovis* antibody in different seasons. The seasonal distribution of *B.ovis* antibodies peaked in spring (76% and 74.3%) in sheep and goats respectively followed by summer (75.6% and 73.7%) in sheep and goats, respectively.

One hundred and forty three ticks (62 from sheep and 81 from goats) (Table 5) were examined for the determination of sex and species. Ninety five (39 from sheep and 56 from goats) were found to be female. In terms of species, 75.52% were *Rhipicephalus turanicus* (67.74% in sheep and 81.48% in goats), and 24.48% were *Hyalomma anatolicum* (32.26% in sheep and 18.52% in goats) photo (4, 5). *Rhipicephalus turanicus* was the predominant species infested both sheep and goats, male *Rhipicephalus* represented (11.18% and 14.68%) in sheep and goats respectively while female ticks represented 18.18% in sheep and 31.46% in goats.

Discussion

In this study, 50.92% of sheep and 44.69 % of goats were infected with *B.ovis* using blood film examination. A higher and lower prevalences were recorded by many authors. Jurasek, (1986) recorded that 48% of goats were positive for *Babesia ovis*. Inci *et al*., (2002) detected *Babesia ovis* in 17.7% of sheep and 6.38% of goats. Razmi *et al*., (2003) recorded *Babesia ovis* in 23.5% from sheep and in 0.5% in goats. Such variation in the prevalence may be attributed to several factors including difference in localities and consequently difference in climatic conditions which affect the vector activity.

Regarding seasonal variation of prevalence of *Babesia ovis* using blood film examination in sheep and goats. In the spring, the highest prevalence rate (56%) and (54.28%) in sheep and goats, respectively was recorded, followed by summer (51.21%) and (52.63%) in sheep and goats respectively. Many authors reported that the highest prevalence of *Babesia ovis* was observed during spring and summer which are considered the seasons of high activity of tick vector, (Rodriguez *et al*., 1989; Trifonov and Ruseve 1989; Pipano, 1991; Yeruham *et al*., 1992).

Concerning the serological prevalence of *Babesia ovis* infection among sheep and goats using IFAT, 71.3% of the examined sheep and 68.2% of the examined goats were proved to be positive reactors. Seasonal variation of prevalence of seroreactors of *Babesia ovis* in sheep and goats showed the same pattern observed by blood smear examination as spring represented the highest prevalence followed by summer, winter and autumn in sheep. In goats spring represented the highest prevalence followed by summer, autumn and winter. IFA has been used by many authors for detection of *B. ovis* among sheep and goats. In Egypt, Mahmoud, (1992) recorded the prevalence of *Babesia ovis* in sheep in Beni-Suef, El-Sharkia, Kafr El-Shikh and El-Fayoum governorates as 90.9%, 88.54%, 87.5% and 86.17% respectively. Papadopoulos *et al*. (1996a) recorded *Babesia ovis* in 52.1% sheep and 36.4% goats. Friedhoff (1997) detected *Babesia ovis* in 50% sheep and 40% goats. Karatepe *et al*. (2003) reported the prevalence of *Babesia ovis* 34.78% in goats and 23.63% in sheep. Variation in the seroprevalence of *Babesia ovis* infection obtained by different authors and those obtained in this study may be attributed to the geographical and climatic conditions, activity of the vector, parasitic status of the investigated area and immune status of the examined animals (Ferrer *et al*., 1998).

Concerning the identification of ticks collected from blood parasite infected sheep and goats, the identified tick species were *Rhipicephalus turanicus* and *Hyalomma anatolicum*. Similar results were obtained by Trifanov and Ruseve, (1989), Al-Asgah, (1990), Papadopoulos *et al*. (1996b), Friedhoff, (1997), Yeruham *et al*. (2000), Abd-El Baky, (2001), Mazyad and Khalaf (2002) and Inci *et al*. (2003). *Babesia ovis* has been reported to be transmitted by *Rhipicephalus turanicus* and *Hyalomma anatolicum* Yeruham *et al*. (1992) and Friedhoff, (1997). Climatic conditions particularly temperature, rainfall, 23 ive humidity and the length of the rainy on have been demonstrated as the important factors affecting the life cycle and abundance of ticks, (Mushi *et al*., 1996 ; Yeruham *et al*., 1996;

Yakhchali and Hosseine, 2006).

Concerning the locality of the investigated area, it represents the most suitable conditions favoring the activity of ticks due to the high temperature in such desert area, the presence of cracks in walls and ground and the lack of hygienic conditions necessary for control of ticks. Such conditions clarify the high prevalence of blood parasites among investigated sheep and goats in Siwa Oasis.

In conclusion, the results obtained in this study clarifies that *B.ovis* is important prevalent pathogen among sheep and goats in Siwa Oasis due to the abundance of the ticks vector as a result of the suitable climatic conditions, poor buildings and lack of sanitations.

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مسح سيرولوجي لطفيل البابيزيا اوفيز في المجترات الصغيرة بواحة سيوة – مصر

تم عمل مسح سيرولوجي لطفيل البابيزيا اوفيز في قطعان الأغنام والماعز بواحة سيوة في الفترة من يناير ٢٠٠٢ إلى يناير ٢٠٠٣ وجدت نسبة الإصابة باستخدام شرائح الدم ٥٠,٨% ، ٤٤,٦% في الأغنام والماعز على التوالي، بينما ارتفعت هذه النسبة إلى ٧١,٣% ، ٦٨,٢% في الأغنام والماعز على التوالي باستخدام اختبار التشعع الفلوريسنتي الغير مباشر . تم تصنيف القراد الجامد إلى نوعين هما: ريبيسفلس ترونيكس ٧٥,٥% وهيالوما اناتوليكم ٢٤,٤% بمنطقة البحث.